

Title (en)
Data aided frequency synchronisation

Title (de)
Datenunterstützte frequenzsynchronisierung

Title (fr)
Synchronisation de fréquence assistée par des données

Publication
EP 1347611 A1 20030924 (EN)

Application
EP 02425173 A 20020320

Priority
EP 02425173 A 20020320

Abstract (en)
Some improvements to the conventional algorithms for data aided frequency synchronisation in cellular systems are introduced in a new method executable by the user equipments of various standards, i.e. 3GPP CDMA-TDMA, FDD mode at 3.84 Mcps, TDD mode at 3.84 Mcps, TDD mode at 1.28 Mcps; CWTS TD-SCDMA; GSM/DCS/GPRS. The method begins to obtain the suboptimal frequency errors Δf using a well known formula which calculates the argument of the autocorrelation over a subset of the baseband samples of the detected training sequence. The errors Δf are stored into a shift register L-position long and averaged to obtain an estimated frequency error Δf_{est} used for recursively correcting the reference frequency of the local oscillator, as: $f_{est}^{(i)} = f_{est}^{(i-1)} + K \Delta f_{est}^{(i)}$ where K ($0 \leq K \leq 1$) is a weighting factor. Contrarily to the simple averaged error of the prior art, a sign criterion is used by which the average is performed on the only terms having the most recurrent algebraic sign among the stored terms Δf . The content of the shift register is corrected after each non-null frequency correction by subtracting $K \cdot \Delta f_{est}$ to all the stored terms Δf . Besides the frequency is corrected upon the following optional conditions, each other independents: The number of terms Δf having equal algebraic sign is greater than a constant α lower than L. The standard deviation σ of the averaged terms Δf is lower than $\beta \cdot \sigma_{old}$, being σ_{old} the sigma of the last non-null frequency correction, and β a constant ≥ 1 . After a minimum number γ of iterations between two non-null frequency corrections are spent, being γ a constant comprised between 1 and L. According to another variant the iterations of the recursive update are subdivided into an initial group with a higher K value for achieving fast convergence and a subsequent group with a lower K for achieving the required accuracy (fig. 13). <IMAGE>

IPC 1-7
H04L 27/233; H04L 27/00

IPC 8 full level
H04L 27/00 (2006.01); **H04L 27/233** (2006.01)

CPC (source: EP US)
H04L 27/0014 (2013.01 - EP US); **H04L 27/233** (2013.01 - EP US); **H04L 2027/0028** (2013.01 - EP US); **H04L 2027/0057** (2013.01 - EP US); **H04L 2027/0095** (2013.01 - EP US)

Citation (search report)
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Designated contracting state (EPC)
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

DOCDB simple family (publication)
EP 1347611 A1 20030924; CN 1204778 C 20050601; CN 1446017 A 20031001; US 2003181183 A1 20030925

DOCDB simple family (application)
EP 02425173 A 20020320; CN 03107332 A 20030320; US 36863403 A 20030220